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Review Article

Transforming Education through Exercise in Sub-Saharan Africa

Wami-Amadi Chisom Faith[1]*, Otto, B. J[1], Victor, P. D[2]

[1]Department of Human Physiology, Faculty of Basic Medical Sciences, College of Medical Sciences, Rivers State University, Nkpolu-Oroworukwo, Port Harcourt, Nigeria
[2]Department of Human Anatomy, Faculty of Basic Medical Sciences, College of Medical Sciences, Rivers State University, Nkpolu-Oroworukwo, Port Harcourt, Nigeria

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***Corresponding author:** Wami-Amadi Chisom Faith
Department of Human Physiology, Faculty of Basic Medical Sciences, College of Medical Sciences, Rivers State University, Nkpolu-Oroworukwo, Port Harcourt, Nigeria

Abstract

Physical activity is essential for enhancing cognitive abilities and academic performance in children. Globally, only 40% of children meet recommended activity levels, with even lower rates in Sub-Saharan Africa due to systemic barriers such as underfunded schools and cultural misconceptions about the role of exercise. These barriers limit children's access to programs that could significantly improve their learning outcomes. This article utilises international and regional evidence to emphasise the positive impact of exercise on memory, attention, and overall academic achievement. This paper emphasises the need to integrate exercise into educational systems across Sub-Saharan Africa.

Keywords: Physical activity, Exercise, Cognitive abilities, Children, Education.

BACKGROUND INFORMATION

Physical activity has significantly improved children's cognitive development and academic performance. However, only 23% of children worldwide meet the World Health Organization's (WHO) recommendation of at least 60 minutes of moderate to vigorous physical activity daily (WHO, 2020). Studies show that physically active children consistently outperform their sedentary peers in cognitive tasks such as problem-solving, memory recall, and attention span. For example, aerobic exercise has increased hippocampal volume by up to 10%, directly enhancing memory retention (Erickson *et al*., 2011). Structured physical education programs are associated with better classroom behaviour and reduced disruptions. A meta-analysis of 58 studies revealed that physical activity improves classroom engagement by 20% and decreases disruptive behaviours by 17% (Fedewa & Ahn, 2011).

Figure 1 below compares the percentage of children meeting the World Health Organization's (WHO) recommended 60 minutes of daily physical activity across different regions. It shows that Africa has the lowest percentage (20%) of children meeting the WHO physical activity guidelines (WHO, 2020). This reflects a significant gap in integrating exercise into daily routines and underscores the need for interventions in Sub-Saharan Africa (Ackah *et al*., 2022).

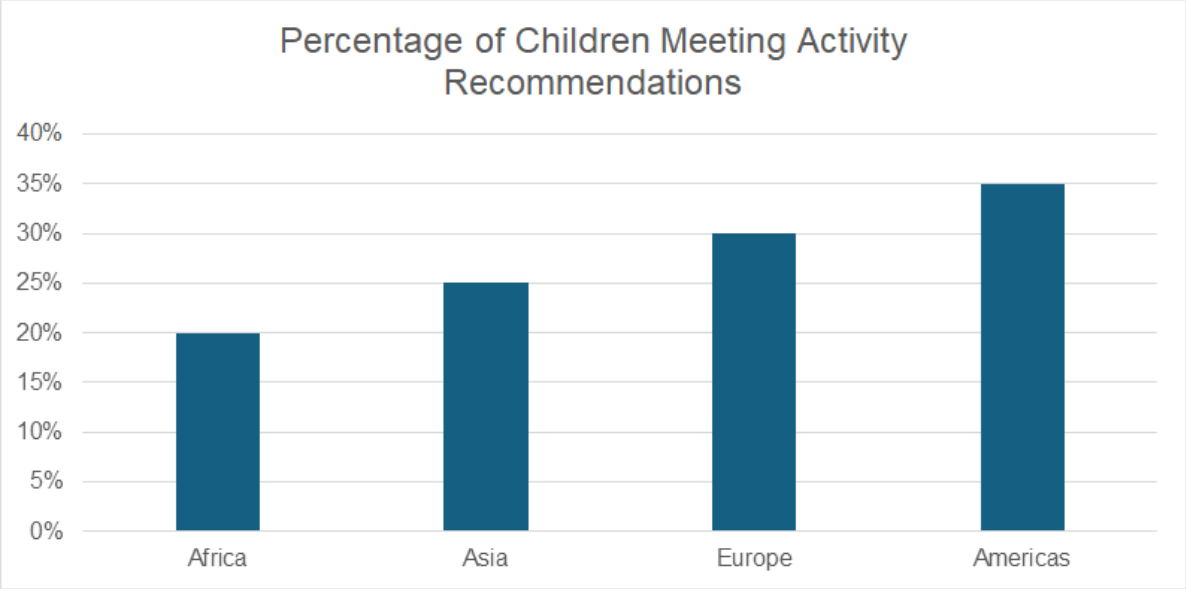

Figure 1: Global Physical Activity Levels among Children (5–17 Years)
Source: WHO, 2020

In Sub-Saharan Africa, systemic challenges such as poor infrastructure, underfunded schools, and large class sizes exacerbate the problem of inadequate physical activity. Approximately 64% of schools in the region lack basic sports facilities, and many rural schools need playgrounds or designated spaces for physical activity (UNESCO, 2021). Cultural attitudes also influence this neglect. In some communities, parents believe exercise distracts children from their studies, making them less likely to encourage physical activity at home or advocate for it in schools (Hillman *et al*., 2008; Sallis *et al*., 2022).

However, regional studies show promising results where physical activity has been integrated (Duflo *et al*., 2017). For example, children in Kenya who participated in structured sports programs performed 25% better in literacy and numeracy assessments than their peers (Onywera, 2009). Similar improvements have been recorded in Tanzanian schools that adopted daily exercise routines, with attendance rates increasing by 30% (Mkenda *et al*., 2017).

METHODOLOGY

This paper is a systematic review synthesising data from peer-reviewed journal articles, governmental reports, and international health organisations. The following methodology was used to ensure a rigorous review process:

- Databases Searched: Google Scholar, PubMed, WHO, UNESCO, and Scopus.
- Inclusion Criteria: Studies published between 2008 and 2023 focusing on physical activity and its impact on cognitive and academic performance among children in Sub-Saharan Africa.
- Exclusion Criteria: Non-peer-reviewed articles, opinion pieces, and studies not addressing education-related cognitive outcomes directly.
- Review Approach: Studies were categorised based on cognitive, psychological, and academic benefits, and common findings were synthesised into thematic areas.

RESULTS

Physiological and Cognitive Impacts

Regular physical activity significantly enhances brain health by increasing blood flow and stimulating the production of brain-derived neurotrophic factor (BDNF) (Biomolecules, 2023). BDNF plays a crucial role in neuroplasticity, supporting memory, focus, and problem-solving abilities.

A study conducted in Nigeria found that children who engaged in regular physical activity improved their math scores by 20% and solved cognitive tasks 35% faster than their sedentary peers (Akinroye *et al*., 2016). Aerobic exercise has been linked to improved cognitive control and working memory, particularly in preadolescent children (Chaddock *et al*., 2011). These findings highlight how even modest increases in physical activity can yield measurable academic benefits.

Psychological Benefits

Exercise is also linked to psychological well-being by reducing cortisol levels, which helps children manage stress and anxiety (Martikainen *et al*., 2013). For example, in Uganda, children participating in community sports programs showed a 40% reduction in anxiety levels and engaged more actively in classroom discussions (Schaalma *et al*., 2014; Nkuba *et al*., 2019).

Beyond stress reduction, physical activity fosters teamwork and resilience, enhancing social interactions and classroom dynamics (Hoekman & Breedveld, 2020). Exercise also strengthens executive functions, including working memory and impulse control, which are critical for academic success (Diamond, 2013).

This suggests that integrating structured physical activities into school curricula can have broader socio-emotional benefits.

Academic Performance

Several studies in Sub-Saharan Africa demonstrate the positive link between exercise and academic outcomes. In South Africa, the implementation of the *Daily Mile* program—a simple 15-minute daily exercise routine—resulted in a 16% improvement in literacy test scores and a 12% reduction in absenteeism (Draper *et al*., 2020).

Similarly, in Tanzania, students participating in daily exercise programs exhibited a 25% increase in attendance alongside significant improvements in language and numeracy skills (Mkenda *et al*., 2017). A meta-analysis of studies found that structured physical activity interventions improved students' test scores and cognitive abilities (Singh, 2019).

These findings reinforce the idea that structured physical activity is not just a health intervention but a catalyst for educational success. Table 1 below summarizes the impacts of exercise intervention on student performance following interventions in some Sub-Saharan African countries.

Table 1: Academic Improvements Linked to Exercise in Sub-Saharan Africa

Country	Intervention	Academic Impact (%)	Attendance Improvement (%)
Kenya	Structured sports programs	+25% (Math/Reading)	N/A
South Africa	*Daily Mile* program	+16% (Literacy)	12% Absenteeism Reduction
Tanzania	Daily exercise (30 min/day)	+25% (Language)	+30%
Uganda	Community sports programs	N/A	+30% (Classroom Engagement)

Sources: Onywera, 2009; Draper *et al*., 2020; Mkenda *et al*., 2017; Nkuba *et al*., 2019

DISCUSSION

Challenges in Integrating Physical Activity into Education Despite the proven benefits of physical activity, its integration into education systems in Sub-Saharan Africa faces several challenges.

Resource constraints are among the most significant barriers. Many schools lack sports facilities, equipment, or trained physical education teachers. This lack of infrastructure disproportionately affects rural areas, where schools struggle to meet even basic academic needs. For example, UNESCO (2021) reports that over 60% of schools in Sub-Saharan Africa lack dedicated sports spaces, limiting opportunities for children to engage in structured exercise.

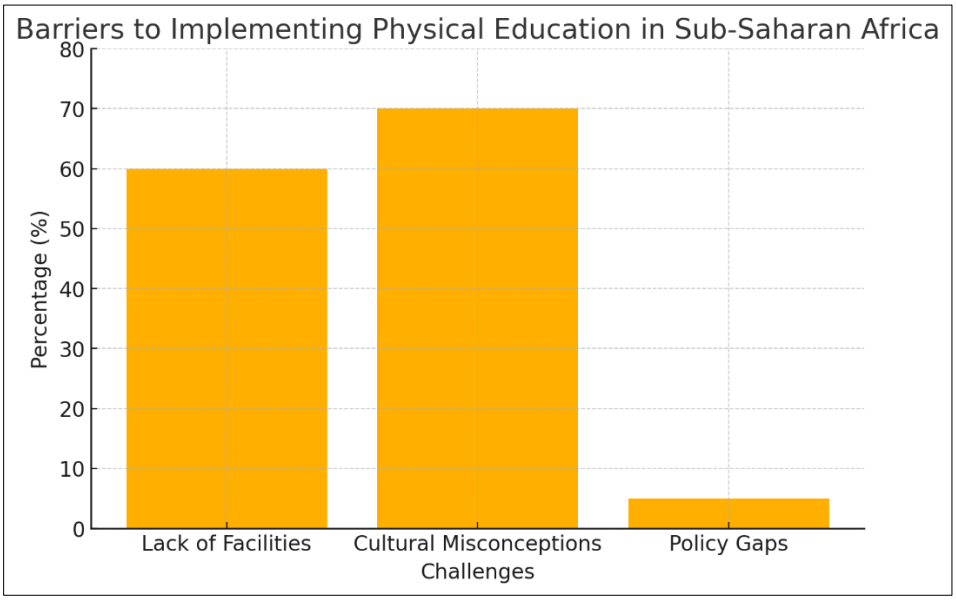

Figure 2: Barriers to Implementing Physical Education in Sub-Saharan Africa
Source: UNESCO, 2021

Figure 2 above depicts these challenges according to the UNESCO (2021) report. Similarly, cultural misconceptions also impede progress. In many communities, exercise is seen as a distraction rather than a tool for academic success. A survey in rural Kenya revealed that 70% of parents believed physical activity took time away from studies, not realizing that exercise enhances memory, focus, and classroom behaviour (Onywera, 2009). Addressing these misconceptions requires targeted awareness campaigns emphasizing the link between exercise and improved academic outcomes. Sharing success stories from regional initiatives like the Daily Mile program in South Africa can help change perceptions.

Furthermore, policy gaps exacerbate the problem. While some countries include physical education in their curricula, enforcement is often weak. For instance, Uganda mandates physical education in schools but allocates less than 5% of teaching time to physical activity, significantly reducing its impact (Nkuba *et al*., 2019). Governments must prioritize physical education by mandating at least 15% of school hours for exercise and allocating funding for sports infrastructure and teacher training.

Future Research

While the reviewed studies demonstrate a strong link between physical activity and academic performance, several gaps remain:

1. Longitudinal Studies Needed: Many studies assess short-term cognitive benefits, but research tracking the long-term impacts of structured exercise programs is lacking.
2. Cultural Perceptions: More research is needed to address cultural misconceptions that discourage exercise in schools, mainly rural communities.
3. Policy Implementation Gaps: Despite policy recommendations, enforcement of physical education programs remains weak. Future research should evaluate implementation strategies.

Implications for Policy and Practice:

Governments and educational institutions should prioritise exercise integration into school curricula. Mandatory physical education policies with adequate funding for infrastructure and teacher training are crucial.

Declarations

Ethics Approval and Consent to Participate: Not applicable.

Consent for Publication: Not applicable.

Availability of Data and Materials: The datasets used and/or analysed during the current study are available from the corresponding author upon reasonable request.

Competing Interests: The authors declare that they have no competing interests.

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CONCLUSION

Exercise is a critical yet often neglected aspect of education in Sub-Saharan Africa, promoting learning, social skills, anxiety reduction, and teamwork. Systemic challenges, including lack of resources and cultural attitudes, prevent effective integration of physical activity in schools. The evidence from Sub-Saharan Africa strongly supports the role of physical activity in improving cognitive function, mental well-being, and academic performance. Implementing structured physical activity programs in schools can lead to higher test scores, improved attendance, reduced stress, and greater classroom engagement. Given these benefits, policymakers and educators should consider integrating exercise into daily school routines to optimize students' overall development. Addressing these issues requires a collaborative effort from governments, international organisations, and communities to achieve a better educational future. Policies mandating physical education and advocacy initiatives to shift cultural perceptions are necessary. With focused investments and commitment, Sub-Saharan Africa can enhance its educational systems and support children's development.

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